

AMENDMENTS TO THE DRAWINGS

The drawings have been amended to add FIG. 5. FIG. 5 is similar to FIG. 1 and includes cables 30. Support for FIG. 5 can be found throughout the specification of the application as filed, such as, for example, at page 7, lines 8-13, page 12, lines 18-25, and page 13, lines 1-2. No new matter has been added.

A new replacement drawing sheet is submitted herewith.

REMARKS

Claims 1-33 are pending. By this Amendment, claims 3, 5, and 33 are cancelled and claims 1, 4, 6, 13, 21, and 28 are amended. No new claims are added.

Objections to the Drawings

The drawings were objected to under 37 CRR 1.83(a) for not showing every feature of the invention specified in the claims. FIG. 5 has been added to show every feature of the invention specified in the claim. In particular, the portion of FIG. 5 related to reference numeral 30 has been added to show the cables on which monitoring devices can be mounted.

Support for FIG. 5 can be found throughout the specification of the application as filed, such as, for example, at page 7, lines 8-13 (“The detecting apparatus may be towed, e.g., as a streamer or series of streamers behind a surface of a submarine vessel. Thus, the detecting apparatus preferably comprises a plurality of monitoring devices mounted on a plurality of cables, the monitoring devices on each cable preferably being spaced from each other by a distance which is less than the wavelength of the transmitted seismic event to prevent spatial aliasing of the recorded wavefield.”), page 12, lines 18-25 (“The camera units would normally be mounted on or connected to cables which are towed behind a vessel or by a dedicated submarine propulsion device. The position of the cameras relative to the seabed is determined by acoustic techniques and the cables are steered by “wings” on the cables. Vertical forces on the cables are balanced by weights or ballast. The cables provide mechanical connection between an array of camera units and also provide energy and communication convections. In a typical arrangement there are several cables, each towing an array of camera units.”), and page 13, lines 1-2

(“Alternatively, the connection between the camera units may be wireless e.g., a radio connection either instead of or in addition to the cables.”). Therefore, no new matter has been added. Applicant respectfully requests that the objection to the drawings be withdrawn.

Objections to the Specification

The specification was objected to for having a title of the invention that is not descriptive. The specification has been amended herein so that the title now reads “SEISMIC EXPLORATION AND IMAGING SYSTEM FOR PRODUCING SURVEY REPORTS OF SUBSEA GEOLOGICAL STRUCTURES.”

The specification has also been amended to add a reference numeral to the term “cable” or “cables” in the Detailed Description of the Invention. Specifically, cables are now indicated by reference numeral 30, as depicted in FIG. 5.

Amendments to the Claims

Claim 1 has been amended to include the subject matter of claim 3 and provide sufficient antecedent basis for certain claims that depend from claim 1. Claim 3 has been cancelled. Claims 4 and 6 have been amended to depend from claim 1. Claims 13 has been amended so that there is sufficient antecedent basis in claims from which claim 13 depends. Claims 21 has been amended to include additional subject matter. Claim 28 has been amended so that there is sufficient antecedent basis in claims from which claim 28 depends.

Claims Rejections – 35 U.S.C. § 112

Claims 9-20 and 28-30 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

The Office Action states that “Claim 1 is limited to a ‘Method of seismic exploration’ and not ‘marine seismic exploration’” and, therefore, is insufficient antecedent basis for “the limitation ‘A method of marine seismic exploration, as claimed in claim’ in the preamble of [claim 13].” Claim 13 has been amended to delete “marine.”

The Office Action also states that “there is a lack of antecedent basis for the limitation of the monitoring apparatus” in claims 9, 11, and 13.” The Office Action further states that claim 10 depends from claim 9, claim 12 depends from claim 11, and claims 14-20 depend from claim 13 and are therefore also indefinite. Claims 9 and 11 depend from claim 2, which depends from claim 1. Claim 13 depends from claim 1. Claim 1 has been amended to recite “a monitoring apparatus.” Therefore, claims 9, 11, and 13 are not indefinite because there is sufficient antecedent basis in claim 1, as amended. Claims 10, 12, and 14-20, which depend from claims 9, 11, and 13, respectively, are also not indefinite.

The Office Action also states that “Claim 21 is limited to an ‘apparatus for seismic exploration’ and not ‘marine seismic exploration’” and, therefore, is insufficient antecedent basis for “the limitation ‘An apparatus for marine seismic exploration, as claimed in claim 11’ in the preamble of [claim 28].” The Office Action further states that “Claims 29-30 depend from claim 28, and are therefore also indefinite.” Applicant respectfully points out that the preamble of claim 28 recites “An apparatus for marine seismic exploration, as claimed in claim 21,” not “as

claimed in claim 11.” Nonetheless, Claim 28 has been amended to delete “marine.” Therefore, claim 28, as amended, is not indefinite. Claims 29-30, which depend from claim 28, are also not indefinite.

Claims Rejections – 35 U.S.C. § 102

Claims 1-4, 6-13, 16-19, 21-23, 25-28, 30, and 32 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No 5,070,483 to Berni (“Berni”).

Independent claims 1 and 21, as amended, are directed to monitoring apparatuses which are “moved relative to the earth’s surface during the response period.” Referring to page 6, lines 8-13 of the specification provide as follows:

Due to the *relative movement* between surface and the “camera”, the speckled pattern seen by the light detector may change within the seismic time. When the camera is moving, the speckled pattern moves very fast and therefore the speckle monitoring must be carried out much more often than every 1 ms to be able to detect/recognize and therefore monitor the same speckle group every ms.

(Emphasis added.)

In contrast, Berni neither teaches nor suggests relative movement between the earth’s surface and a monitoring apparatus. Rather, Berni is directed to a monitoring apparatus that remains stationary relative to the earth’s surface during a response period. Specifically, Berni provides that heterodyne interferometry techniques are used to detect signal frequency. (Col. 5, lines 31-34.) Berni also provides that:

The total area of a desired survey is divided up into smaller parts. Each part must then be illuminated over an area covering sufficient dimension that seismic data collected from each part is representative of the seismic motions for that part. An area or spot of about 0.5 m in diameter should be sufficient to replace a single geo-phone. Alternatively, a larger or smaller area may be illuminated, as discussed later herein. A receiver at some distant point from the surface detects and records a superposition of waves, each from a slightly different portion of the surface. A one-to-one relationship between spots and receivers is presently preferred; thus, a matrix of receivers is needed to simultaneously image all the detection spots. Alternatively, one beam and receiver may be used to quickly scan between each of the locations where seismic signals are desired to be detected.

(Col. 6, lines 6-22.) One skilled in the art will recognize that when a heterodyne interferometric system is used as described in Berni, movement between the beam and the detection area creates noise that would render the system impractical. As a result, some compensation for the movement of the support must be built into the system in order to maintain each beam stationary on each pre-selected spot or detection area. The techniques described by Berni thus require that the areas under consideration be constant during the time over which a seismic record is taken. In other words, the detection area monitored by a monitoring device remains stationary relative to the earth's surface during the detection, or response, period. When the detection period has ended, a new stationary detection area is selected and the process repeated.

Therefore, Berni does not provide a teaching as required by 35 U.S.C. § 102(b) to meet the recitations of claims 1 and 21, as amended. In particular, Brani does not teach or suggest relative movement between a monitoring apparatus and the earth's surface during a response period. Claims 1 and 21 are thus allowable. Claims 2-4, 6-13, and 16-19 depend from claim 1 and claims 21-23, 25-28, 30, and 32 depend from claim 21 and are therefore also now allowable.

Claims Rejection – 35 U.S.C. § 103

Claims 14-15, 20, 29, and 31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Berni and further in view of U.S. Patent No. 4,701,011 to U.S. Patent No. 6,134,966 to Donskoy (“Donskoy”). The amended claims are believed to be patentable over the references cited by the Examiner. To the extent that the rejections may apply to the amended claims, Applicant respectfully traverses the rejections.

Claims 14-15 and 20 depend from claim 13, which depends from claim 1. Claim 29, which depends from claim 28, and claim 31 depend from claim 21. Neither Berni nor Donskoy, alone or in combination, teaches or suggests a monitoring apparatus which is “moved relative to the earth's surface during the response period,” as recited in each of claim 1 and claim 21 in combination with the other recited elements of each claim. Accordingly, claim 1, from which claims 14-15 and 20 depend, and claim 21, from which claims 29 and 21 depend, are allowable. The rejections to claims 14-15, 20, 29, and 31 are traversed but not expressly argued in light of the allowability of the underlying base claims.

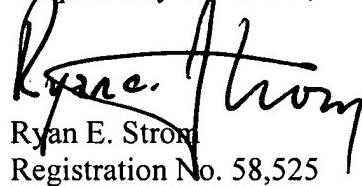
For at least these reasons, Applicant respectfully asserts that independent claims 1 and 21 and their associated dependent claims are not obvious in light of the prior art of record in the present application.

Conclusion

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,



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